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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/745,047	12/20/2000	Robert M. Geffken	BUR9-2000-0063-US1	7966

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EXAMINER
SOWARD, IDA M

ART UNIT	PAPER NUMBER
2822	

DATE MAILED: 11/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/745,047	GEFFKEN ET AL.	
	Examiner	Art Unit	
	Ida M Soward	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 September 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14 and 29-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14 and 29-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *06 September 2002* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

This Office Action is in response to Applicants' amendment filed September 6, 2002.

Drawings

The objection to Figures 1-3E has been withdrawn due to the amendment filed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-7, 9-14, 29, 32-39 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art Figures 1-3E in view of Farooq et al. (5,705,857).

Prior Art Figures 1-13E teach an electronic structure **10**, comprising: a substrate layer **12** that includes a first electronic device **20**; a passivation layer **48** on the substrate layer an in mechanical contact with the substrate layer, wherein the passivating layer is on the first electronic device and is in mechanical contact with the first electronic device; a first insulative layer **49** on the passivating layer and in mechanical contact with the passivating layer; a first damascene conductive wire/stud **61** having a lower portion in the first insulative layer and an upper portion above the first insulative layer; a second

insulative layer **7** on the first insulative layer; a damascene conductive wiring line structure **8** within the second insulative layer; the lower portion of the first damascene conductive wire/stud is conductively coupled to a first portion **23** of the first electronic device; a second damascene conductive wire/stud **62** having a lower portion in the first insulative layer and an upper portion above the first insulative layer, wherein the lower portion of the second damascene conductive wire/stud is conductively coupled to a second portion **22** of the first electronic device; the first electronic device being a MOS field effect transistor (FET), wherein the first portion of the first electronic device includes a gate of the FET, and wherein the second portion of the first electronic device is selected from the group consisting of a source of the FET and a drain of the FET; the substrate layer further comprising a second electronic device **30**, and wherein the electronic structure further comprising: a second damascene conductive wire/stud having a lower portion in the first insulative layer and an upper portion above the first insulative layer, wherein the lower portion of the second damascene conductive wire/stud is conductively coupled to the second electronic device; and a damascene conductive wiring line **67** within the second insulative layer, wherein the damascene conductive wiring line is above the second damascene conductive wire/stud and is insulatively isolated from the second damascene conductive wire/stud; a shallow trench isolation (STI); an internal seam or void oriented lengthwise within the first damascene conductive wire/stud; and a conductive liner **68**. However, Prior Art Figures 1-3E fail to teach a metallic cap. Farooq et al. teach a metallic caps **23** (having a preferred thickness of about 0.100 to 1.000 microns) of an electrically conductive material

selected from the group consisting of aluminum, chromium, cobalt, gold, nickel, palladium, platinum, silver, to name a few that is in contact with the upper portion of a conductive wire and is different from the conductive copper stud **18**; a dual damascene **28** within a second insulative layer (passivation) **30** (which covers metallic cap **23**) such that a dual damascene **128** is above the second metallic cap **23** and is conductively coupled to the second metallic cap; and a conductive wiring line structure **131** is above and in contact with metallic cap **23** (Figures 4-5, cols. 4-5, lines 9-67 and 1-36, respectively). Farooq et al. further teach Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the structure of Prior Art Figures 1-3E with the metallic cap of Farooq et al. to reduce process variability.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art Figures 1-3E and Farooq et al. (5,705,857) as applied to claim 1 above, and further in view of Cheek et al. (6,018,180).

Prior Art Figures 1-3E and Farooq et al. teach all mentioned in the rejection above. However, Prior Art Figures 1-3E and Farooq et al. fail to teach a lower portion of a conductive stud is on the STI. Cheek et al. teach a lower portion of a conductive stud **470** is on the STI **220** (Figure 12, col. 8, lines 9-43). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the structure of Prior Art Figures 1-3E and the metallic cap of Farooq et al. with the STI of Cheek et al. to obtain a higher yield.

Claims 30-31 and 40-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art Figures 1-3E and Farooq et al. (5,705,857) as applied to claims 1-7, 9-14, 29, 32-39 and 42 above, and further in view of Christensen et al. (6,121,659).

Prior Art Figures 1-3E and Farooq et al. teach all mentioned in the rejection above. However, Prior Art Figures 1-3E and Farooq et al. fail to teach an insulative layer thickness that is greater then 250 nm. Christensen et al. teach an insulative layer thickness that is greater then 250 nm [0.2 to 0.7 microns] (col. 6, lines 18-28). Given dimensions by Christensen et al. it is within the level of ordinary skill for the distance between a top surface of the wire/stud and a top surface of the insulative layer to fall between about 100 nm and about 400 nm. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic structure of Prior Art Figures 1-3E and the metallic cap of Farooq et al. with the insulative layer thickness of Christensen et al. to characterize by pronounced dielectric capabilities.

Response to Arguments

Applicant's arguments with respect to claims 1-14 and 29-42 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ida M Soward whose telephone number is 703-305-3308. The examiner can normally be reached on Monday - Thursday, 6:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9309 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ims
November 17, 2002

AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800